

# Complementary Silicon Plastic Power Transistors

Specifically designed for power audio output, or high power drivers in audio amplifiers.

- DC Current Gain Specified up to 8.0 Amperes at Temperature
- All On Characteristics at Temperature
- High SOA: 20 A, 18 V, 100 ms
- TO-247AE Package

## MAXIMUM RATINGS

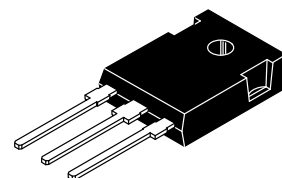
| Rating  | Symbol         | MJW21191<br>MJW21192 | Unit                         |
|---|----------------|----------------------|------------------------------|
| Collector-Emitter Voltage   | $V_{CEO}$      | 150                  | Vdc                          |
| Collector-Base Voltage  | $V_{CB}$       | 150                  | Vdc                          |
| Emitter-Base Voltage  | $V_{EB}$       | 5.0                  | Vdc                          |
| Collector Current — Continuous<br>— Peak  | $I_C$          | 8.0<br>16            | Adc                          |
| Base Current  | $I_B$          | 2.0                  | Adc                          |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 100<br>0.65          | Watts<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{stg}$ | -65 to +150          | $^\circ\text{C}$             |

## THERMAL CHARACTERISTICS

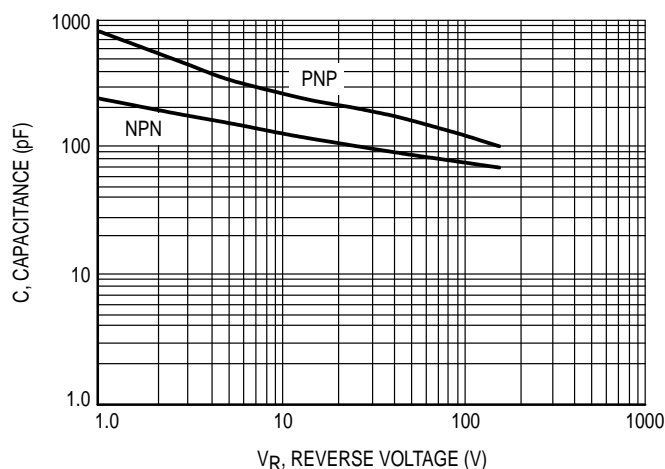
| Characteristic                          | Symbol          | Max  | Unit               |
|---|-----------------|------|--------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 0.65 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 50   | $^\circ\text{C/W}$ |

**NPN**  
**MJW21192**  
**PNP**  
**MJW21191**

**8.0 AMPERES**  
**POWER TRANSISTORS**  
**COMPLEMENTARY**  
**SILICON**  
**150 VOLTS**  
**100 WATTS**



**CASE 340K-01**  
**TO-247AE**



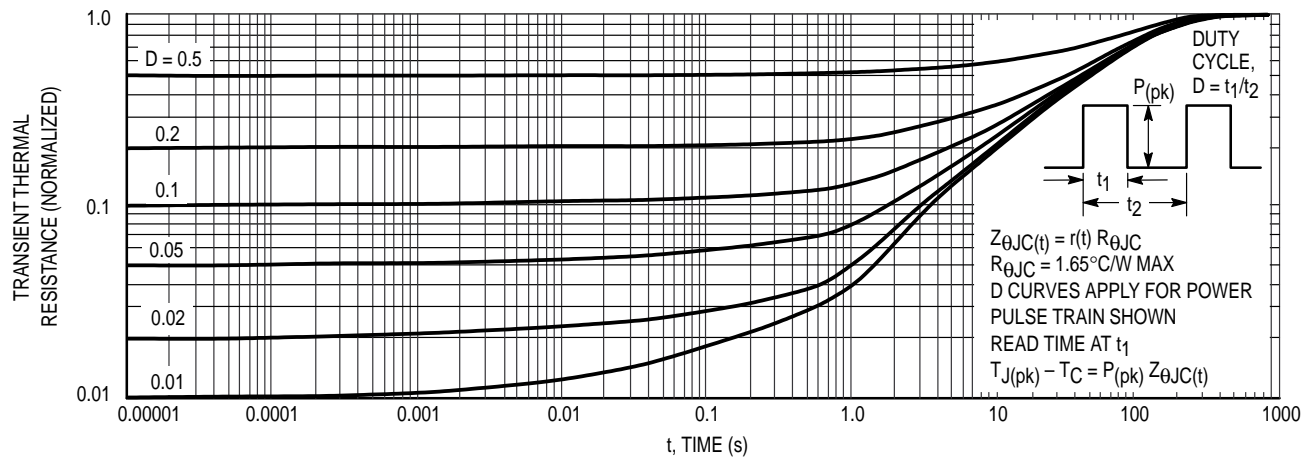
**Figure 1. Typical Capacitance @  $25^\circ\text{C}$**

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic   | Symbol         | Min       | Max        | Unit            |
|--|----------------|-----------|------------|-----------------|
| <b>OFF CHARACTERISTICS</b>   |                |           |            |                 |
| Collector–Emitter Sustaining Voltage (1)<br>( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )   | $V_{CEO(sus)}$ | 150       | —          | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 250\text{ Vdc}$ , $I_E = 0$ )  | $I_{CES}$      | —         | 10         | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )  | $I_{EBO}$      | —         | 10         | $\mu\text{Adc}$ |
| <b>ON CHARACTERISTICS (1)</b>  |                |           |            |                 |
| DC Current Gain<br>( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )<br>( $I_C = 8.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )                | $h_{FE}$       | 15<br>5.0 | —<br>—     | —<br>100        |
| Collector–Emitter Saturation Voltage<br>( $I_C = 4.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ )<br>( $I_C = 8.0\text{ Adc}$ , $I_B = 1.6\text{ Adc}$ ) | $V_{CE(sat)}$  | —<br>—    | 1.0<br>2.0 | Vdc             |
| Base–Emitter On Voltage<br>( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )  | $V_{BE(on)}$   | —         | 2.0        | Vdc             |
| <b>DYNAMIC CHARACTERISTICS</b>   |                |           |            |                 |
| Current Gain — Bandwidth Product (2)<br>( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )                        | $f_T$          | 4.0       | —          | MHz             |

(1) Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

(2)  $f_T = |h_{fe}| \cdot f_{test}$ .



**Figure 2. Thermal Response**

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figures 3 and 4 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} < 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 2. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

NPN — MJW21192

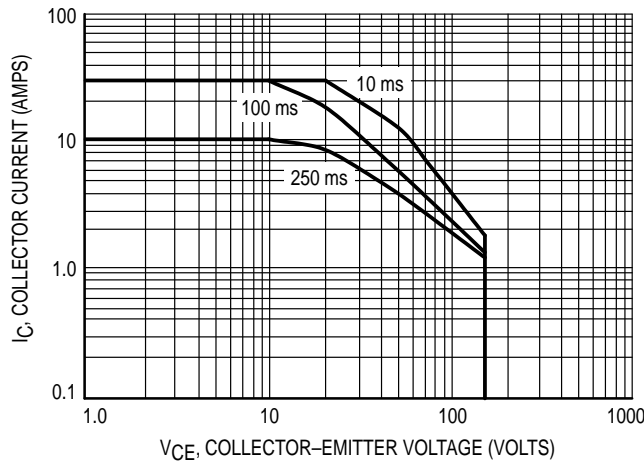


Figure 3. NPN — MJW21192  
Safe Operating Area

PNP — MJW21191

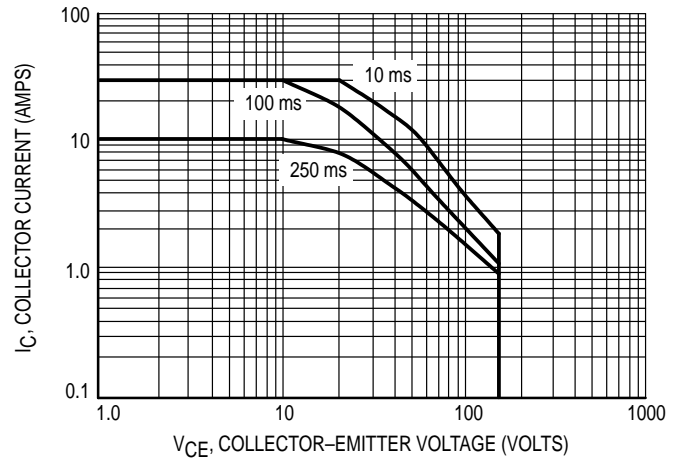


Figure 4. PNP — MJW21191  
Safe Operating Area

## TYPICAL CHARACTERISTICS

NPN — MJW21192

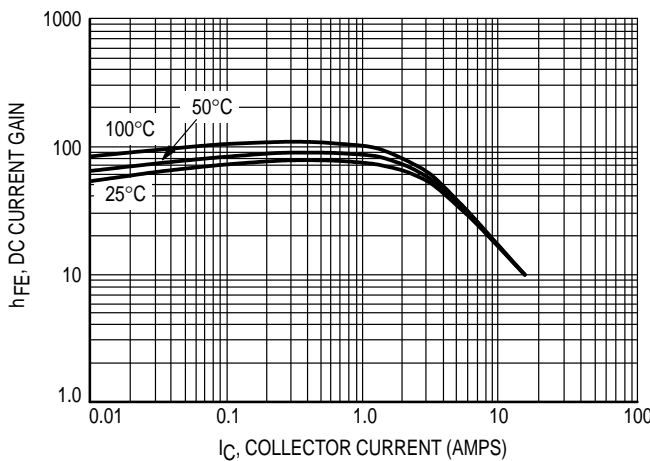


Figure 5. NPN — MJW21192  
 $V_{CE} = 2.0\text{ V}$  DC Current Gain

PNP — MJW21191

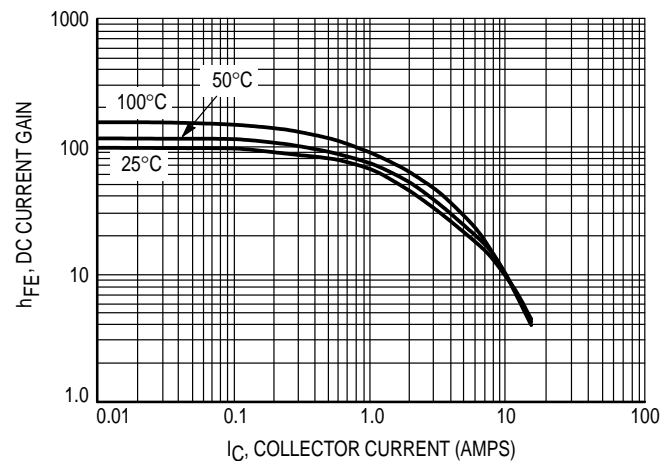


Figure 6. PNP — MJW21191  
 $V_{CE} = 2.0\text{ V}$  DC Current Gain

NPN — MJW21192

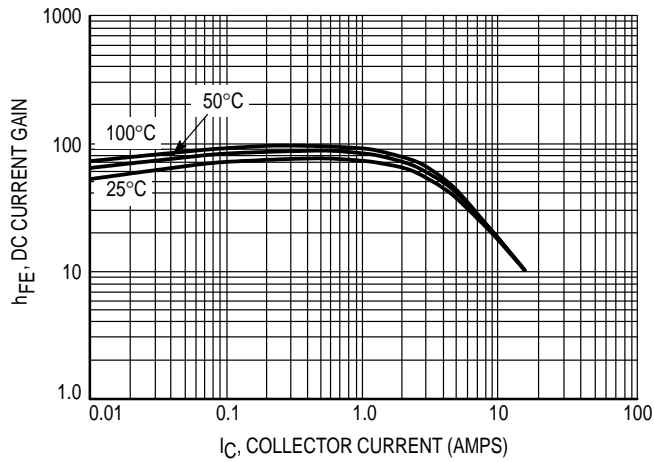


Figure 7. NPN — MJW21192  
VCE = 5.0 V DC Current Gain

PNP — MJW21191

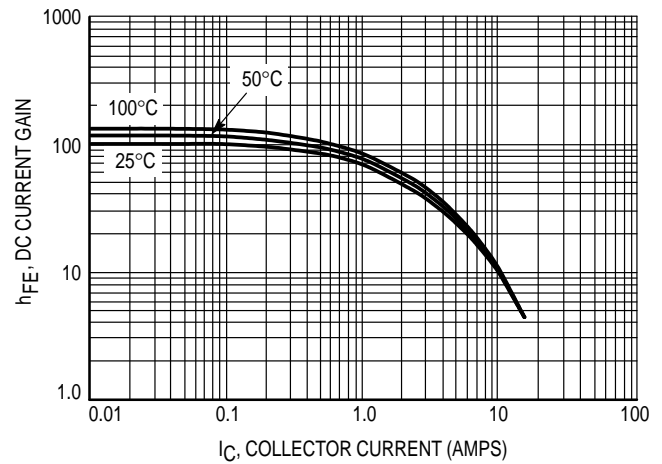


Figure 8. PNP — MJW21191  
VCE = 5.0 V DC Current Gain

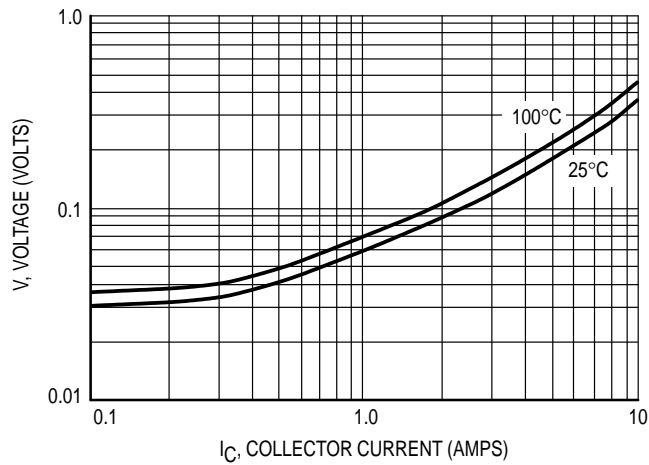


Figure 9. NPN — MJW21192  
VCE(sat) IC/IB = 5.0

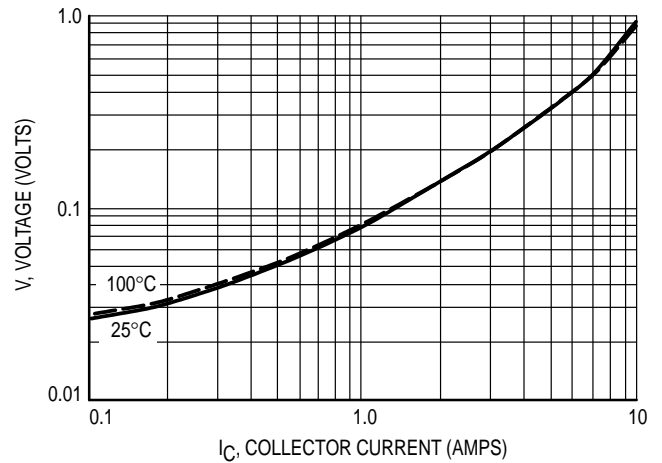


Figure 10. PNP — MJW21191  
VCE(sat) IC/IB = 5.0

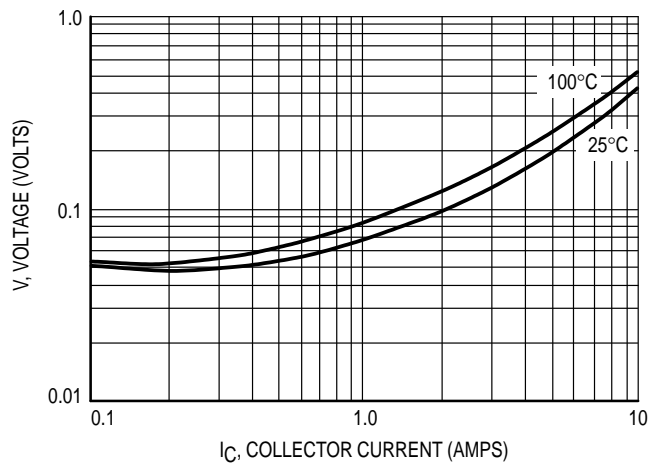


Figure 11. NPN — MJW21192  
VCE(sat) IC/IB = 10

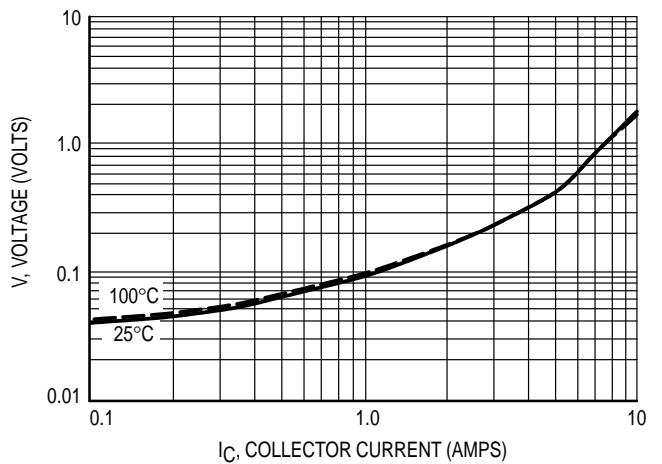
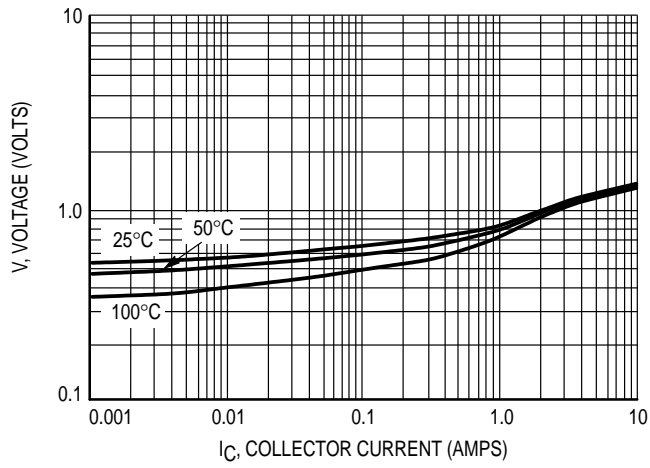


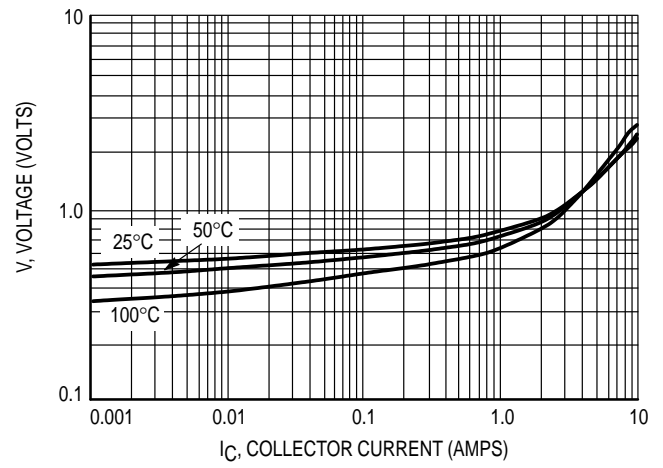
Figure 12. PNP — MJW21191  
VCE(sat) IC/IB = 10

**NPN — MJW21192**



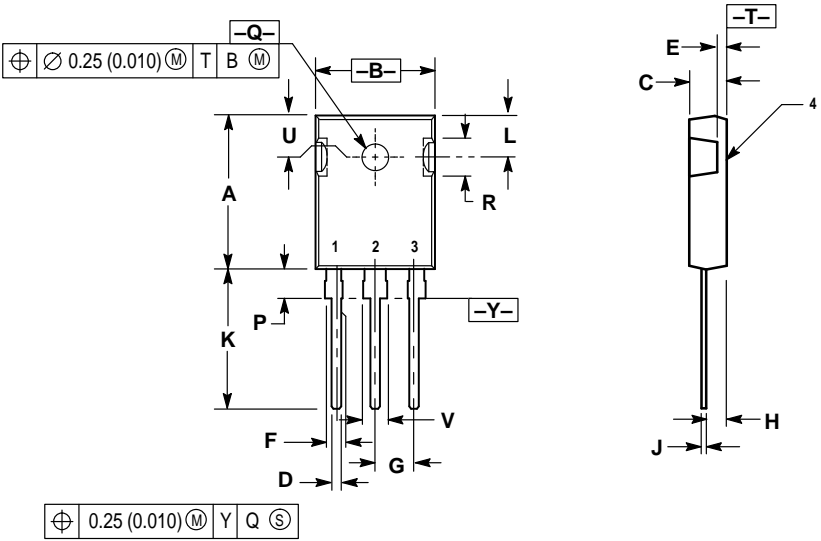
**Figure 13. NPN — MJW21192**  
 **$V_{CE} = 2.0$  V  $V_{BE(on)}$  Curve**

**PNP — MJW21191**



**Figure 14. PNP — MJW21191**  
 **$V_{CE} = 2.0$  V  $V_{BE(on)}$  Curve**


PACKAGE DIMENSIONS



NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: MILLIMETER.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 19.7        | 20.3 | 0.776     | 0.799 |
| B   | 15.3        | 15.9 | 0.602     | 0.626 |
| C   | 4.7         | 5.3  | 0.185     | 0.209 |
| D   | 1.0         | 1.4  | 0.039     | 0.055 |
| E   | 1.27 REF    |      | 0.050 REF |       |
| F   | 2.0         | 2.4  | 0.079     | 0.094 |
| G   | 5.5 BSC     |      | 0.216 BSC |       |
| H   | 2.2         | 2.6  | 0.087     | 0.102 |
| J   | 0.4         | 0.8  | 0.016     | 0.031 |
| K   | 14.2        | 14.8 | 0.559     | 0.583 |
| L   | 5.5 NOM     |      | 0.217 NOM |       |
| P   | 3.7         | 4.3  | 0.146     | 0.169 |
| Q   | 3.55        | 3.65 | 0.140     | 0.144 |
| R   | 5.0 NOM     |      | 0.197 NOM |       |
| U   | 5.5 BSC     |      | 0.217 BSC |       |
| V   | 3.0         | 3.4  | 0.118     | 0.134 |

CASE 340K-03  
(TO-247AE)  
ISSUE A

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